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THE
ONTARIO WATER RESOURCES
COMMISSION
MUNICIPAL POLLUTION SURVEY
OF THE
CITY OF CORNWALL

1963 - 1964

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Report on municipal pollution
survey of the city of Cornwall.

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REPORT ON

MUNICIPAL POLLUTION SURVEY

of the

CITY OF CORNWALL

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Report
on
MUNICIPAL POLLUTION SURVEY
of the
CITY OF CORNWALL

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INTRODUCTION

A municipal pollution survey of the City of Cornwall was performed during the period of November 18 - 21, 1963, in order to assess conditions existing within the municipality which might affect the sanitary quality of the waters of the St. Lawrence River and its tributaries. Enquiries and investigations were made with respect to outfalls which discharge to these watercourses. Samples were collected to determine the significance of these outfalls and their effects on the receiving stream.

Interviews were held with the following officials during the survey:

- Mr. Chas. Adams, P. Eng., City Engineer,
- Dr. J. A. Thomson, Medical Officer of Health,
- Mr. J. Mullineux, Chief Public Health Inspector,
- Mr. P. Payette, Public Health Inspector.

The above-mentioned officials provided much valuable assistance during this survey.

CITY OF CORNWALL

Cornwall, known as the Seaway City, is a major industrial and commercial centre located in the Seaway Valley tourist area. According to the 1963 Municipal Directory, the city has a population of 43,200 and a total area of 19,200 acres.

The City of Cornwall is bounded on the south by the Old Cornwall Canal and St. Lawrence River, on the east

by the Stormont-Glengarry county boundary, on the north by Division Road and on the west by the impounding dyke of Lake St. Lawrence.

The business and industrial area developed, quite naturally, along the waterfront on a site set out prior to 1784 when it was known as New Johnstown. Its present name was given in honour of the Duke of Cornwall, who later became George IV.

THE ST. LAWRENCE RIVER AND TRIBUTARIES

The St. Lawrence River opposite Cornwall is divided into two channels by Cornwall Island. The volume of water was reported to range from 140,000 cfs. to 310,000 cfs., which represent the drainage flows of the entire Great Lakes Watershed of 296,000 square miles. Immediately west of the city limits is located the Moses-Saunders Generating Station and one of the worlds largest dams sitting astride the St. Lawrence River.

Several small creeks; namely Robertson, Blackadder, Fly, Leitch, and Grays conduct surface flows and sanitary and industrial wastes to the St. Lawrence River. Surface flows in the northern section of the city discharge to the upper reaches of the Raisin River. Fly and Leitch Creeks are almost entirely tiled in and pass under the Old Cornwall Canal to the north bank of the river.

WATER USES

Municipal

The municipal water purification plant is located in the west end of Cornwall opposite the Domtar Pulp and Paper Limited mill on Second Street. Lake St. Lawrence is the source of supply.

The plant consists of high lift pumping units, sedimentation and filtration facilities and clear water storage. Chemical treatment consists of pre- and post-chlorination, coagulation and fluoridation.

Ground Water

Ground water is employed by private dwellings in the areas of the city not served by the municipal supply.

Industrial

Industrial use of the canal waters is made by the Domtar Pulp and Paper Limited mill and the Courtaulds group plants.

Recreation

Popular swimming areas include St. Lawrence Park on the river, Silver Bridge (foot of Marlborough Street), and the Roosevelt Bridge on the canal. All the above-mentioned bathing areas have not enjoyed the local health unit's approval for several years now.

SEWERAGE SYSTEMS

Existing

Combined storm and sanitary flows have access to the St. Lawrence River through the Fly and Leitch Creek sewers as well as numerous other sewers east of the Old Cornwall Canal area without benefit of treatment.

Proposed

City officials are proceeding with a programme of storm drainage and sewage works which will be developed over a seven year period. The treatment plant and outfall sewer are scheduled for completion during the third year of construction. The plant is to be located north of Highway #2 opposite the west end of Pilon Island. The outfall sewer is planned to extend into the main stream of the St. Lawrence River west of Pilon Island. The treatment of sanitary flows will include primary settling and effluent chlorination. Digested sludge will be hauled to neighbouring farmland for disposal.

The treatment of industrial waste flows from the Domtar paper mill and the Courtaulds group is not included in this programme.

An interceptor sewer will be constructed along the waterfront to conduct gravity flows to a sewage pumping station located in the vicinity of the treatment plant.

SEWAGE PUMPING STATIONS

Three pumping stations, the St. Felix, Glenview Heights, and Riverdale units are employed in the sewer system. The Riverdale station could overflow to Blackadder Creek during periods of heavy precipitation. The Glenview Heights station could discharge to Grays Creek during heavy rains. Reportedly, the St. Felix station does not have overflow facilities.

INDUSTRIAL WASTE DISPOSAL

Numerous industrial firms are located in Cornwall. Two firms employing large volumes of water in their operations are the Domtar Pulp and Paper Limited and the Courtaulds group. The former plant produces fine paper with its sanitary and industrial wastes discharging to the Fly Creek sewer, while the latter plants are engaged in the production of viscose, rayon, tufted carpet and cellulose film, with their sanitary and industrial waste flows discharging to the St. Lawrence River via separate private sewers.

Although sanitary sewer connections would be available to both firms, the separation and diversion of sanitary waste flows at the paper mill will reportedly involve extensive internal alterations while the interception of sanitary flows at the Courtaulds plants may prove to be quite routine in nature. In the interests of public health, no effort should be spared to ensure that wastes of faecal

origin receive the benefit of adequate treatment prior to their discharge to any natural watercourse.

During August and September 1964, separate investigations by the Industrial Wastes Branch of this Commission were carried out at Courtaulds (Canada) Limited, Domtar Pulp and Paper Limited and Canadian Industries Limited.

At the Coutaulds (Canada) Limited plant the data collected revealed that 12,800,000 gpd of wastes are sewered to the St. Lawrence River containing approximately 4,300 pounds of 5-day BOD, 4,100 pounds of suspended solids, and 120,000 pounds of sulphate as SO_4 . Although plant effluent quality has improved since the 1962 investigation substantial corrective measures are still necessary in order to meet OWRC objectives.

At the Domtar Pulp and Paper Limited plant the data collected revealed that 42,900,000 gpd of wastes were being sewered to the St. Lawrence River, containing a 5-day BOD loading of 206,000 pounds and a suspended solids loading of 219,000 pounds. By comparison to an investigation in 1962, the report concludes that the overall improvement in effluent quality at this plant is negligible. Therefore, increased efforts to upgrade the effluent quality should be exerted.

At the Canadian Industries Limited plant the investigation conducted in September 1964 indicated that by comparison to the 1962 survey, the effluent quality in terms of 5-day BOD and pH had deteriorated. Consequently, improved in-plant controls should be effected to limit the concentration of polluting materials being discharged from this plant.

A list of other industrial firms is appended.

SAMPLING PROCEDURES AND RESULTS

The location of sampling points are shown on the appended map of the City of Cornwall. It is noted that samples were collected from all outfalls located with significant flows. Stream samples were collected at pertinent points in order to assess the influence of waste flows on the receiving stream.

All the laboratory tests included in this report were performed at the Ontario Water Resources Commission laboratory in Toronto. The significance of these tests is included in an appendix to this report.

Air temperature during the period of this survey ranged from 31° to 56° Fahrenheit. Approximately 1½ inches of rain fell during November 18, the first day of the survey. Very slight precipitation occurred during November 20 and 21.

LABORATORY RESULTS

The laboratory results of analyses and examinations performed on the samples collected are shown in appendices to this report as follows:

Table I	-	St. Lawrence River
Table II	-	Grays Creek
Table III	-	Old Cornwall Canal
Table IV	-	Robertsons Creek
Table V	-	Raisin River
Table VI	-	Sewer Outfalls to St. Lawrence River

St. Lawrence River

According to the laboratory tests performed, the

effects of the Fly Creek outfall were evident in the St. Lawrence River one-third mile downstream at the new International Bridge. Stream quality suffered in the vicinity of St. Lawrence Park, Courtauld's outfalls and the Danis sewer outfall.

A recent report from this Commission's Biology Branch reveals that river water in the vicinity of Cornwall imparted a taint to the flesh of a large percentage of several species of fish.

Grays Creek

Fly Creek flows north of 12th Street have recently been diverted to the Grays Creek Watershed.

Stream quality in Grays Creek suffered at three points namely; a tributary at Anthony Street; a tributary north of Second Street east of Courtaulds railway siding; the Fly Creek diversion at Tenth Street East.

Old Cornwall Canal

The Old Cornwall Canal waters met this Commissions objectives for stream quality although Blackadder Creek, which is tributary to the canal had a high coliform content which may be attributed to sanitary wastes continuing to gain access to storm sewers.

A considerable volume of waste high in BOD and alkalinity was escaping from the Iroquois Chemical plant to Blackadder Creek via a tributary ditch.

Robertsons Creek

Stream quality suffered in Robertsons Creek below the outfall from the Industrial Plaza septic tank. Since this area is not included in the overall sewerage works proposals, a method of subsurface disposal of septic tank effluents would provide protection for the receiving stream.

Raisin River

Stream quality with respect to coliform content exceeded this Commission's objectives at every sampling point but one.

Inadequately treated sanitary wastes may have access to this watercourse at various locations since most of this area is not serviced with municipal sewers.

A municipal sanitary landfill site located west of Nine Mile Road at Division Road may have influenced the bacteriological quality of the local tributary of the Raisin River at this point.

Sewer Outfalls to the St. Lawrence River

A sample collected from Glen-Stor-Dun Lodge revealed ineffective chlorination practices at the time of sampling. This institution will have access to the proposed municipal sewage treatment plant.

The trunk sewer to the new plant will connect to the Leona Street, Lefebvre Avenue, and Danis Avenue sewers.

The Courtaulds group sanitary sewage flows will

have access to the new trunk sewer; however, the large volume of industrial waste from these mills is not included in the municipal sewage works programme.

The Classical College, Alice Street, Prince Arthur and McConnell Avenue sewer discharges will be directed to the new trunk sewer.

Contaminated flows from the private sewers serving the Old Canadian Cottons building could have access to the new trunk sewer with some in-plant modifications.

The Leitch Creek sewer flows will also be diverted to the new trunk sewer.

All sanitary and industrial flows in the Fly Creek sewer with the exception of those contributed by the Howard Smith plant will be directed to the new plant. Industrial treatment requirements at this paper mill are not included in the overall municipal project. Extensive in-plant alterations will be necessary to provide the desirable segregation of sanitary flows for direction to the new treatment works.

SUMMARY AND CONCLUSIONS

A municipal pollution survey of the City of Cornwall was conducted during the period of November 18-21, 1963. Samples were collected from all known outfalls and from water-courses at appropriate locations.

This survey was conducted to assess the possible pollution of the waters of the St. Lawrence River and its

tributaries within the city. Generally, the discharging of sanitary and industrial wastes to the watercourses results in severe pollution as indicated by the laboratory results.

Separate investigations and subsequent reports have been prepared by the Industrial Wastes Branch of this Commission on the three larger industries, namely Domtar Pulp and Paper Limited, Courtaulds (Canada) Limited and Canadian Industries Limited.

In view of the excessive volume and strength of wastes continuously being sewered from these plants and the apparent impracticability of their inclusion in the municipal sewage works program, separate arrangements will have to be made by the respective firms.

The municipal sewage works program is staged for completion over a seven year period. The treatment facilities to be provided will include primary settling, separate sludge digestion and effluent chlorination.

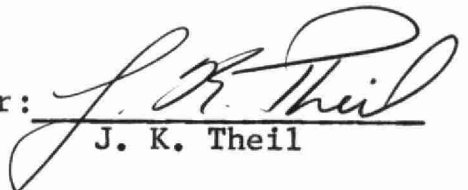
RECOMMENDATIONS

1. The City of Cornwall should proceed with its program of sewage works development.
2. Adequate waste treatment should be provided for the Industrial Plaza septic tank effluent at present discharging to Robertsons Creek.

3. The firm of Iroquois Industrial Chemicals Limited should take the necessary action to ensure that inadequately treated wastes do not have access to the pertinent watercourse.
4. The firms of Domtar Pulp and Paper Limited, Courtaulds (Canada) Limited and Canadian Industries Limited should proceed with intensified efforts to provide satisfactory treatment of the plant wastes.

All of which is respectfully submitted,

District Engineer:


J. K. Theil

Approved by:


K. H. Sharpe, Director

APPENDIX

SIGNIFICANCE OF LABORATORY ANALYSIS

BACTERIOLOGICAL EXAMINATION

The membrane filter technique is employed to obtain a direct enumeration of coliform organisms and is reported per 100 millilitres. The presence of coliforms indicates pollution from human or animal excrement, or from some non-faecal forms. A membrane filter coliform count in excess of the desirable upper limit of 2400 organisms is considered to render waters undesirable for bathing purposes.

SANITARY CHEMICAL ANALYSIS

Biochemical Oxygen Demand (BOD)

Biochemical Oxygen Demand is reported in parts per million (ppm), and is an indication of the amount of oxygen required for the stabilization of decomposable organic matter in the water. The completion of the laboratory test required five days, under the controlled incubation temperature of 20° Centigrade.

The Commission objective for surface water quality is an upper limit of four (4) ppm.

Solids

The value for total solids, expressed in parts per million (ppm), is the sum of the values for the suspended and the dissolved matter in the water. The concentration of

suspended solids is generally the most significant of the solids analyses in regards to surface water quality.

The effects of suspended solids in water are reflected in difficulties associated with water purification, depositions in streams and injury to the habitat of fish. Where suspended solids values are less than 20 ppm, laboratory difficulties are experienced and the turbidity is determined instead.

Turbidity

Turbidity is caused by the presence of suspended matter, such as clay, silt, finely divided organic matter, plankton and other microscopic organisms in water. It is an expression of the optical property of a sample and results are reported in "turbidity units".

Additional specific analyses are performed, when deemed necessary, to evaluate other aspects of water quality. Some of these analyses include tests for the presence of sulphates, sulphide, phenolic equivalents, zinc, lignins as well as pH values.

pH

The pH value, for practical purposes, refers to acidity or alkalinity, and is a measure of intensity rather than quantity. The pH scale extends from zero (very acidic) to 14 (very alkaline), with the middle value of 7 corresponding to neutrality at 25° Centigrade. The pH of surface water

should be in the range of 6.7 to 8.5.

Lignin

Lignin is a plant constituent which is often discharged as a waste during the manufacture of paper pulp. This matter is determined by a colourimetric method and is reported in parts per million (ppm) as tannic acid.

Phenols

The phenolic compounds, collectively referred to as phenols are those hydroxy derivatives of benzene or its condensed nuclei, which are determined by the Gibbs Method with modifications. The results are reported in parts per billion (ppb). Phenols are present in waste flows from many industrial processes. Dependent on the concentration, the presence of these materials may be toxic to fish or may taint the flesh of fish. Phenols in very minute concentrations will combine with chlorine to produce intense tastes and odours which are variously described as medicinal, chemical or iodoform.

As an objective, the concentration of phenols should average not more than two (2) ppb and definitely not exceed five (5) ppb at any point in receiving waters subsequent to initial dilution.

MUNICIPAL SANITARY SURVEY OF THE CITY OF CORNWALL

TABLE NO. 1

(SAMPLES PERTINENT TO ST. LAWRENCE RIVER)

SAMPLES COLLECTED BY: A. R. COLES
A. D. MCCONNELLALL ANALYSIS, EXCEPT PH, REPORTED
IN PPM UNLESS OTHERWISE INDICATED

SAMPLE POINT NUMBER	DATE 1963	DESCRIPTION OF SAMPLING POINTS	5-DAY BOD	S O L I D S			TOTAL COLIFORMS PER 100 ML	PH AT LAB.	ALKALINITY AS CaCO_3	SULPHIDE AS H_2S	TURBIDITY UNITS	SULPHATES AS SO_4
				TOTAL	SUSP.	DISS.						
SL21.7A	Nov.20	ST. LAWRENCE RIVER 1/5 DISTANCE FROM CORNWALL ISLAND TO PILON ISLAND	1.4	178	2	176	86	8.1	--	--	--	23
SL21.7B	Nov.20	ST. LAWRENCE RIVER 2/5 DISTANCE FROM CORNWALL ISLAND TO PILON ISLAND	1.0	184	2	182	108	8.0	--	--	--	23
SL21.7C	Nov.20	ST. LAWRENCE RIVER 3/5 DISTANCE FROM CORNWALL ISLAND TO PILON ISLAND	1.2	180	2	178	94	8.0	--	--	--	23
SL21.7D	Nov.20	ST. LAWRENCE RIVER 4/5 DISTANCE FROM CORNWALL ISLAND TO PILON ISLAND	2.4	176	2	174	3,900	8.0	--	--	--	23
SL21.7E	Nov.20	ST. LAWRENCE RIVER 1/3 DISTANCE FROM PILON ISLAND TO SHORE	1.6	180	2	178	13,500	7.8	--	--	--	24
SL21.7F	Nov.20	ST. LAWRENCE RIVER 2/3 DISTANCE FROM PILON ISLAND TO SHORE	2.8	218	3	215	17,100	7.8	--	--	--	29
SL22.80	Nov.20	ST LAWRENCE RIVER OPPOSITE DAVIS AVE.	4.4	222	5	217	214,000	--	--	--	--	--
SL22.90	Nov.20	ST. LAWRENCE RIVER OPPOSITE COURTAULDS MAIN OFFICE	9.6	261	5	256	93,000	--	--	--	--	--
SL22.91	Nov.20	ST LAWRENCE RIVER OPPOSITE COURTAULDS WEST SEWER OUTFALL	6.0	276	6	270	8,900	--	--	--	--	--
SL22.92	Nov.20	ST. LAWRENCE RIVER OPPOSITE ST. LAWRENCE PARK	4.4	276	2	274	11,900	--	--	--	--	--
SL24.91	Nov.20	ST. LAWRENCE RIVER AT INTERNATIONAL BRIDGE	9.8	284	82	202	10,300	7.7	--	--	--	25
SL24.93	Dec.9	ST. LAWRENCE RIVER 100 FT. BELOW FLY CREEK OUTFALL PHENOLS IN PPB - 0 ACIDITY AS CaCO_3 - 76 LIGNINS - 175	400	2218	437	1781	185,000,000	6.4	--	--	--	172
SL24.95	Nov.20	ST. LAWRENCE RIVER ABOVE FLY CREEK OUTFALL	1.4	160	3	157	76	--	--	--	--	--

TABLE I (CONT'D)

SAMPLE POINT NUMBER	DATE 1963	DESCRIPTION OF SAMPLING POINTS	5-DAY BOD	S O L I D S			TOTAL COFIFORMS PER 100 ML	PH AT LAB.	ALKALINITY AS CaCO_3	SULPHIDE AS H_2S	TURBIDITY UNITS	SULPHATES AS SO_4
				TOTAL	SUSP.	DISS.						
SL28.5	Nov. 19	ST. LAWRENCE RIVER ABOVE ROBERTSON CREEK OUTFALL	1.9	198	3	195	228	--	--	--	--	--
SL28.6A	Nov. 19	LAKE ST. LAWRENCE AT MID- POINT ON R.H.S. DAM	2.0	198	2	196	184	--	--	--	--	--
SL28.6B	Nov. 19	LAKE ST. LAWRENCE AT EAST END OF R.H.S. DAM	1.9	196	2	194	166	--	--	--	--	--
SL28.95	Nov. 19	LAKE ST. LAWRENCE AT OLD CORNWALL CANAL	1.4	202	3	199	156	--	--	--	--	--

ALL ANALYSIS, EXCEPT PH, REPORTED
IN PPM UNLESS OTHERWISE INDICATED

MUNICIPAL SANITARY SURVEY OF THE CITY OF CORNWALL

TABLE NO. 2
(SAMPLES PERTINENT TO GRAYS CREEK)

SAMPLES COLLECTED BY: A. R. COLES
A. D. MCCONNELL

SAMPLE POINT NUMBER	DATE 1963	DESCRIPTION OF SAMPLING POINTS	5-DAY BOD	S O L I D S			TOTAL COLIFORMS PER 100 ML	PH AT LAB.	ALKALINITY AS CaCO_3	SULPHIDE AS H_2S	TURBIDITY UNITS	SULPHATES AS SO_4
				TOTAL	SUSP.	DISS.						
G 0.0	NOV.20	GRAYS CREEK AT HWY.#2	2.2	378	14	364	1,700	--	--	--	--	--
G-2-2.37	NOV.20	GRAYS CREEK TRIBUTARY AT ANTHONY STREET	56.0	2020	60	1960	90,000	--	--	--	--	--
G-2-1-2.60	NOV.20	GRAYS CREEK TRIBUTARY DITCH AT COURTAULDS R. R. SIDING - N. OF 2ND STREET	1.6	644	14	630	190	--	--	--	--	--
G-2-2.61	NOV.20	GRAYS CREEK TRIBUTARY EAST OF COURTAULDS R. R. SIDING - N. OF 2ND STREET	94.0	2968	63	2905	43,000	--	--	--	--	--
G-3-4.1	NOV.20	GRAYS CREEK - FLY CREEK DIVERSION AT 10TH STREET	1.8	598	9	589	8,400	--	--	--	--	--
G-3-4.7	NOV.20	GRAYS CREEK - FLY CREEK DIVERSION NORTH OF CARLETON STREET	3.3	502	15	487	108	--	--	--	--	--
G-3-6.3	NOV.19	GRAYS CREEK - FLY CREEK DIVERSION AT BROOKDALE AVENUE	2.4	196	6	190	2,500	--	--	--	--	--

MUNICIPAL SANITARY SURVEY OF THE CITY OF CORNWALL

ALL ANALYSIS, EXCEPT PH REPORTED
IN PPM UNLESS OTHERWISE INDICATED

TABLE NO. 3
(SAMPLES PERTINENT TO THE OLD CANAL)

SAMPLES COLLECTED BY: A. R. COLES
A. D. McCONNELL

SAMPLE POINT NUMBER	DATE 1963	DESCRIPTION OF SAMPLING POINTS	5-DAY BOD	S O L I D S			TOTAL COLIFORMS PER 100 ML	PH AT LAB.	ALKALINITY AS CaCO ₃	TURBIDITY UNITS
				TOTAL	SUSP.	DISS.				
SLC24,8	DEC. 4	CANAL SPILLWAY SOUTH OF D.O.T. SHOPS	1.9	160	3	157	380	7.7		1.8
SLCB27,78	NOV. 21	BLACKADDER CREEK OUTFALL TO CANAL	3.2	422	18	404	97,000			
SLCB0,321	DEC. 4	IROQUOIS CHEMICAL OUTFALL TO BLACKADDER CREEK	200	12,860	3,188	9,672		12.4	8380	340
SLC28,9	NOV. 19	CORNWALL CANAL AT CORNWALL DYKE	2.7	212	5	207	240			

MUNICIPAL SANITARY SURVEY OF THE CITY OF CORNWALL

ALL ANALYSIS EXCEPT PH REPORTED
IN PPM UNLESS OTHERWISE INDICATED

TABLE NO. 4

(SAMPLES PERTINENT TO ROBERTSONS CREEK)

SAMPLES COLLECTED BY: A. R. COLES
A. D. MCCONNELL

<u>SAMPLE POINT NO.</u>	<u>DATE</u> <u>1963</u>	<u>DESCRIPTION OF SAMPLING POINTS</u>	<u>5-DAY</u> <u>BOD</u>	<u>S O L I D S</u>		<u>DISS.</u>	<u>TOTAL COLIFORMS</u> <u>PER 100 ML</u>
				<u>TOTAL</u>	<u>SUSP.</u>		
RC 0.0	NOV. 19	ROBERTSON CREEK OUTFALL TO ST. LAWRENCE RIVER	2.8	320	7	313	73,000
RC 0.09	NOV. 19	ROBERTSON CREEK AT OLD HWY. #2	2.0	424	5	419	13,000
RC 0.26S	NOV. 19	INDUSTRIAL PLAZA SEPTIC TANK OUTFALL TO ROBERTSON CREEK	14	524	59	465	12,000,000
RC 0.27	NOV. 19	ROBERTSON CREEK ABOVE INDUSTRIAL PLAZA SEPTIC TANK OUTFALL	2.3	388	5	383	200
RC 1.51	NOV. 19	ROBERTSON CREEK AT TOLL GATE ROAD	1.8	296	4	292	540

MUNICIPAL SANITARY SURVEY OF THE CITY OF CORNWALL

ALL ANALYSIS EXCEPT PH REPORTED
IN PPM UNLESS OTHERWISE INDICATED

TABLE NO. 5
(SAMPLES PERTINENT TO RAISIN RIVER)

SAMPLES COLLECTED BY: A. R. COLES
A. D. MCCONNELL

SAMPLE POINT NO.	DATE 1963	DESCRIPTION OF SAMPLING POINTS	5-DAY BOD	S O L I D S			TOTAL COLIFORMS PER 100 ML
				TOTAL	SUSP.	DISS.	
RS 13.1	Nov. 19	RAISIN RIVER SOUTH BRANCH AT EAST CITY LIMITS	4.6	284	37	247	13,200
RS 15.5	Nov. 19	RAISIN RIVER SOUTH BRANCH - NORTH TRIBUTARY AT DIVISION ROAD EAST OF MCCONNELL AVENUE	2.8	308	17	291	3,800
RS 15.9	Nov. 19	RAISIN RIVER SOUTH BRANCH AT MCCONNELL AVENUE	3.0	372	38	334	300
RS 16.6	Nov. 19	RAISIN RIVER SOUTH BRANCH SOUTH TRIBUTARY AT TOLL GATE ROAD	2.5	316	18	298	7,000
RS 17.8	Nov. 19	RAISIN RIVER - SOUTH BRANCH - SOUTH TRIBUTARY AT BROOKDALE AVENUE	2.0	320	6	314	4,000
RSM 16.1	Nov. 19	RAISIN RIVER - SOUTH BRANCH - MIDDLE TRIBUTARY AT GEORGE STREET	2.7	312	19	293	5,900
RS 16.1	Nov. 19	RAISIN RIVER - SOUTH BRANCH AT SOUTH END OF EDGAR STREET	2.6	328	40	288	6,500
RS 18.1	Nov. 19	RAISIN RIVER - SOUTH BRANCH AT DIVISION ROAD WEST OF HWY. #401	3.6	350	34	316	5,400
RS 17.7	Nov. 19	RAISIN RIVER - SOUTH BRANCH - NORTH TRIBUTARY AT NINE MILE ROAD					17,000
RS 19.2	Nov. 19	RAISIN RIVER - SOUTH BRANCH - NORTH TRIBUTARY AT DIVISION ROAD WEST OF NINE MILE ROAD					12,000

MUNICIPAL SANITARY SURVEY OF THE CITY OF CORNWALL

ALL ANALYSIS, EXCEPT PH, REPORTED
IN PPM UNLESS OTHERWISE INDICATED

TABLE NO. 6
(SEWER OUTFALLS TO ST. LAWRENCE RIVER)

SAMPLES COLLECTED BY: A. R. COLES
A. D. MCCONNELL

SAMPLE POINT NO.	DATE 1963	DESCRIPTION OF SAMPLING POINTS	5-DAY	S O L I D S			TOTAL COLIFORMS PER 100 ML	PH AT LAB.	ALKALINITY AS CaCO ₃
			BOD	TOTAL	SUSP.	DISS.			
CO 22.41P	NOV. 20	GLEN-STOR-DUN LODGE SEWER OUTFALL	260	466	87	379	75,000,000		
CO 22.77S	NOV. 20	LEONIA STREET SEWER OUTFALL	100	658	75	583	119,000,000		
CO 22.79S	NOV. 20	LEFEBVRE STREET SEWER OUTFALL	60	600	47	553	91,000,000		
CO 22.80S	NOV. 21	DANIS AVENUE SEWER OUTFALL	29	426	15	411	30,000	6.6	60
		SULPHIDE AS H ₂ S = 0.75							
CO 22.891	NOV. 21	COURTAULDS OUTFALL #1	210	8580	253	8327	176	2.3	
		SULPHIDE AS H ₂ S = 12.5							
		ACIDITY AS CaCO ₃ = 2064							
CO 22.901	NOV. 21	COURTAULDS OUTFALL #5	3.0	366	11	355	250	7.2	60
		SULPHIDE AS H ₂ S = 0.25							
CO 22.911	DEC. 4	COURTAULDS OUTFALL BEHIND PUMPHOUSE	7.8	232	32	200	1,550	8.0	120
		TURBIDITY UNITS = 4.0							
		SULPHATE AS SO ₄ = 29							
		IODINE DEMAND AS H ₂ S = 0.2							
		ZINC AS ZN = 0							
CO 22.93S	NOV. 20	CLASSICAL COLLEGE SEWER OUTFALL	56	620	84	536	117,000,000		
CO 22.95S	NOV. 20	ALICE STREET SEWER OUTFALL	82	586	61	525	6,300,000		
CO 22.96S	NOV. 20	LOUISA STREET SEWER OUTFALL	80	602	121	481	105,000,000		
CO 22.97S	NOV. 20	PRINCE ARTHUR STREET SEWER OUTFALL	64	724	91	633	203,000,000		
CO 22.98S	NOV. 20	MCCONNELL AVENUE SEWER OUTFALL	130	512	138	374	259,000,000		
CO 23.0P	NOV. 20	CANADIAN COTTONS BLDG. EAST OUTFALL	2.2	254	4	250	21,000		
CO 23.01P	DEC. 4	CANADIAN COTTONS BLDG. WEST OUTFALL	26	262	9	253	20	6.8	
		TURBIDITY UNITS = 2.6							
CO 23.02P	NOV. 21	CHALET ARTISTIC GLASS SEWER OUTFALL	2.6	214	3	211	180	8.1	
CO 23.91S	DEC. 4	LEITCH CREEK SEWER OUTFALL	35	386	41	345	11,800,000	7.2	
		TURBIDITY UNITS = 8.5							
CO 24.94S	DEC. 9	FLY CREEK SEWER OUTFALL	500	2218	437	1781	185,000,000	6.4	
		SULPHATE AS SO ₄ = 172							
		ACIDITY AS CaCO ₃ = 76							
		PHENOLS IN PPB = 0							
		LIGNINS = 175							
FCS 0.64	NOV. 21	FLY CREEK SEWER AT CUMBERLAND STREET	24	570	113	457	15,800,000		
FC 2.09	NOV. 20	FLY CREEK AT MCCONNELL & ELEVENTH STREET	2.0	894	132	762	127,000		

EXISTING MANUFACTURING INDUSTRIES

Allied Weavers Ltd.	- synthetic fabrics
Arrow Meat Packers	- meat products
Bingley Steel Works Ltd.	- boiler maintenance, ship repairs
Canada Precast Terrazo & Tile	- precast terrazo
Chalet Artistic Glass Ltd.	- ornamental glass pieces
Compo Records (Ontario) Ltd.	- recordings (Div. of Decca)
Concrete Products Ltd.	- concrete blocks
Cornwall Brass & Iron Foundries Ltd.	- iron, brass & aluminum castings
Cornwall Pants & Prince Clothing Ltd.	- men's clothing
Dominion Tape of Canada Ltd.	- pressure sensitive tape
Domtar Construction Materials Ltd.	- conduit
Fiberez of Canada Ltd.	- plastic coatings
Fingerhut International Ltd. (Sovereign Seat Cover Mfg. Co.)	- auto seat covers, coats, etc.
Howards & Sons (Canada) Ltd.	- chemicals, plasticizers
Hydra-Clene Corp. of Canada Ltd.	- wetting agents
Independent Oxygen & Acetylene Co. Ltd.	- oxygen & acetylene
International Fertilizers Ltd.	- fertilizers
Julius Resnick Canada Ltd.	- handbags
Monogram Glass of Canada Ltd.	- decorative glassware
Peebles Products Ltd.	- lactose, whey powders, milk replacers, etc.
Pfizer Corp.	- chemicals
Reach Plastics & Chemicals Ltd.	- refrigerant insulation
Roy's Machine & Fabricating	- foundry
St. Lawrence Rendering Co.	- fats
Standard Freeholder	- printers & publishers
T.C.F. of Canada Ltd.	- cellulose film
Teldonck & Sons Ltd.	- industrial sponges
K. M. White Canada Ltd.	- elevator equipment & assessories
Vanguard Glove Ltd.	- gloves
Virchem of Canada Ltd.	- zinc hydrosulphite

